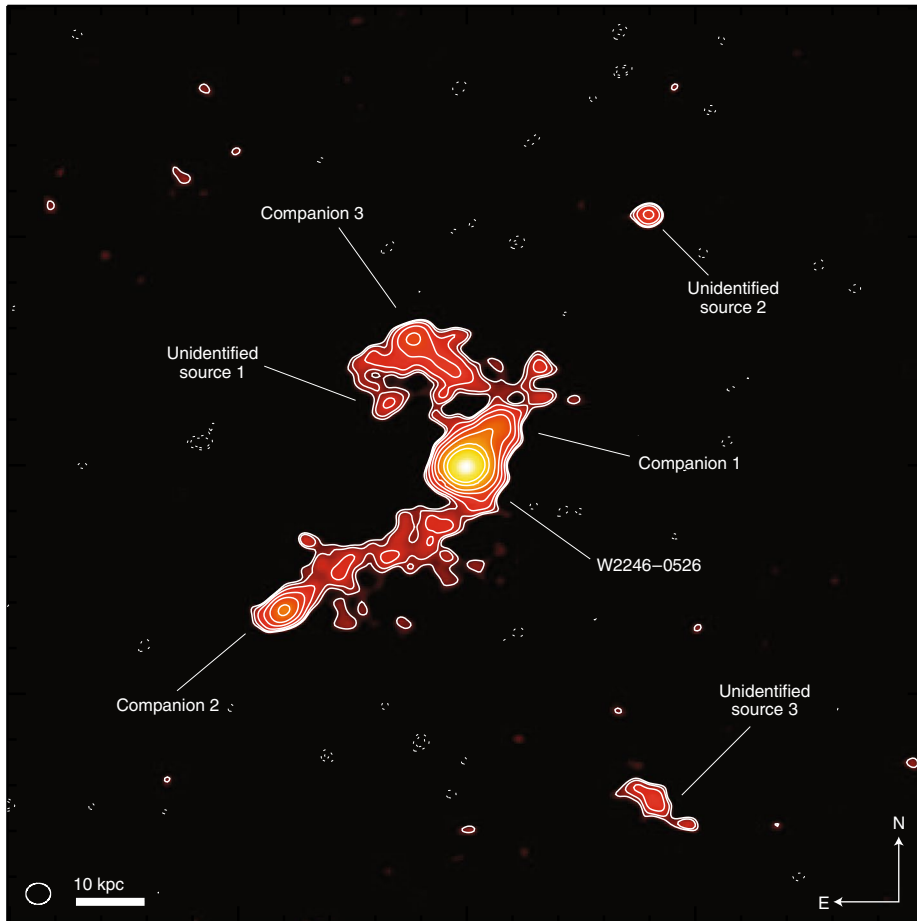


## GALAXY EVOLUTION

## Making a hot DOG

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Credit: AAAS

The hierarchical nature of structure formation and evolution implies that galaxies grow by merging with other galaxies. A galactic merger acts as a mixer that funnels material to the centre of the merging system and sets off intense and typically dust-enshrouded star formation. Tanio Díaz-Santos and collaborators show that a hot dust-obscured galaxy (DOG) at a redshift of 4.6 is interacting with three nearby companions, catching its hierarchical assembly in the act.

W2246-0526 (W2246 hereafter) is the most luminous galaxy we know and hosts an actively accreting supermassive black hole at its centre, a quasar. The authors use optical spectroscopy to confirm the presence of two companions near W2246 and also detect a third companion. They then follow up the system with high-resolution ( $\sim 3.3$  kpc) submillimetre observations with ALMA. The ALMA dust continuum map (pictured) reveals a rich tableau of tidal features

around the companions as well as bridges of material connecting them to W2246.

Combining their ALMA data with CO  $J = 2-1$  observations from the Karl G. Jansky VLA, Díaz-Santos et al. calculate the dust and molecular gas masses in the system. In addition to copious amounts of dust ( $\sim 10^9 M_{\odot}$ ) and molecular gas ( $\sim 10^{11} M_{\odot}$ ) within W2246, the main tidal bridge contains hot dust that is likely illuminated by in situ star formation. The authors conclude that W2246 is in the process of accreting its companions while simultaneously hiding its nucleus behind large columns of dust and gas. This large reservoir of gas feeds the quasar while the quasar-heated dust makes this galaxy a hot DOG.

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